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Impact of Socio-Demographic Factors and Health State on Indicator of Life Satisfaction of Population in Poland

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Abstract

The paper studies the influence of social and demographic factors (age, gender group, lifestyle, presence or absence of chronic diseases) on parameters of self-assessed health and life satisfaction by the population of Poland. The aggregated results of the sociological inquiry carried out in regions of Poland in 2004 were used as the statistical basis. For modelling the tobit models with left and right censoring limit points were used. Age, gender and the presence or absence of chronic diseases are shown by econometric analysis to have a significant influence on indices of self-assessed health. The relationship between life satisfaction of the respondents, their state of health and physical activity was analysed.

Key words: self-assessed health index; self-assessed life satisfaction index; tobit models

1. Introduction

Health of the population is an important resource in socio-economic development of modern society. Nowadays, the understanding of the term "health" in a broad sense includes not only absence of various diseases and serious problems in the human body, but also a good self-assessed state of health, normal

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psychological and physical condition, opportunity of self-realization of the man in society (Wlodarczyk, 1996, Contoyannis et al., 2004).

Health is an important factor, alongside with other social and demographic factors determining indicator of life satisfaction by people in this or that socio-economic system (Frey and Stutzer, 2000).

Health of the population reflects a level of development of society and its social infrastructure, characterizes efficiency of activity of various institutional structures in sphere of public health services and social policy (Karski 1994, Rajkiewicz, 1998). Health of the population determines quality of human resources and labour force, potential of their reproduction and employment in the labour market (Currie and Madrian, 1999). The important problems of economies of many advanced countries are ageing of the population, reduction of young population and low birth-rate indexes.

The health support depends both on the people and on availability of effective medical care and preventive programs. Such aspects of behaviour, as intensive lifestyle, stresses, wrong feeding, smoking and use of alcohol in large quantities, absence of necessary physical exercises exert a negative influence on the man's health, subject him to the risk of catching various diseases and worsen the quality of life. The availability of medical care is determined by social protection system, existing in the state, and principles of financing of public health services system. However, as researches confirm, the persons with high level of the income have better opportunities for support or preservation of health (Contoyannis et al., 2004). For example, in a number of difficult cases (oncological or genetic diseases, traumas, urgent cases) there is a necessity of application of expensive methods of diagnostics and treatment, that may not be always accessible to the patient in an ordinary hospital or such expensive medical operations and the procedures are not covered by health insurance in many cases. Besides lower income in households results in cheaper, irrational feeding, consumption of plenty of flour products and simple fats. People with a low income are not capable to pay services at the fitness-centres and sports halls, pools, health improving centres. Also, frequently enough poor people cannot afford complete rest and rehabilitation, they cannot pay medical advice or teeth dentures etc. In this connection, in the states with the advanced system of social protection and health insurance the necessary medical care is guaranteed to all layers of the population. In the countries, where there is no obligatory health insurance and medical services are paid, the level of the population health essentially depends on their incomes. At the same time, it is impossible to underestimate the influence of the preventive programs and information campaign promoted health value for population. The population with higher level of education has more chances to choose healthy lifestyle, balanced feeding, participation in the preventive programs (Ross and Wu, 1995). Measures for early diagnosis of diseases and educational programs aimed at propagation of healthy lifestyles exert an essential influence on the preservation of the health of the population. As numerous researches prove the prevention of diseases is the main line in public health services of many countries, as the cost of treatment is much higher, than the expenses on the preventive measures.

Many papers in USA and Western Europe are devoted to the problems of interrelation of health conditions of the population, their educational level, incomes, well-being and life satisfaction. At the same time, in the post-socialist countries of Eastern Europe and the new member countries of EU the specified problems have not been given sufficient attention. It is explained by the fact that in comparison with the West-European countries and USA, where the sociological surveys and high-scale econometric research of households conditions, their educational background, employment, self-assessed health and life satisfaction are regularly carried out. In post-soviet countries the similar sociological surveys and research of such scale were introduced just recently and are carried out once in some years. Besides there is no open access to initial databases allowing to estimate individual influence of these or those factors on results of a self-assessed health and life satisfaction of the respondents. Therefore application of ordered probit or logit models is not available, as well as the use of dynamic panels is not obviously possible due to the absence of necessary statistical information.

In our research data on self-assessed health and life satisfaction of respondents in Polish households for 2004 were used. The aggregated data about results and different groups of respondents in this sociological survey was presented for 16 regions (voivodships) of Poland (Marciniak, 2007). The given choice was caused by suitability of the statistical data for econometric modelling. Besides in this period it was possible to estimate the first effects of various reforms in the sphere of public health services and introduction of obligatory health insurance system.

The purpose of the given research is to study the quantitative relationship between a number of social and demographic factors on self-assessed health and life satisfaction indicators on an example of data of households sociological survey in Poland for the year of 2004.

2. The data and methodology

The statistical research submitted in given paper, was based on the aggregated data of results of sociological survey in 16 regions (voivodships) of Poland. These data gave the characteristics of self-assessed health and life satisfaction indicators, lifestyle and leisure time spending with the account for various gender and age groups. It is necessary to note, that in 2004 the sociological research concerning health condition and standard of living in Poland covered 14,5 thousand households. About 42331 respondents living both in urban area and countryside took part in survey. Among the respondents there were 7743 children (under 14 years) and 35248 adults - people at the age of 15 and older. The survey was carried out through three kinds of questionnaire intended for households, adult respondents and children. A particular random selection scheme was used to choose households for research; this scheme provided a balanced survey by taking into account the scale of the voivodships. Interviewers were the specially trained workers of local statistical departments from different voivodships of Poland. The aggregated data on results of households' inspection of self-assessed health and life quality indicators were published in the reports of Central Statistical Office (CSO) in Poland.

In CSO research on different voivodships of Poland the self-assessed health indicators was shown as a nominal variable, having three possible variants of responses: "good and very good health", "fair health" and "poor and very poor health". The level of life satisfaction also was given as a categorical variable, having three variants: "good and very good life", "fair life" and "bad and very bad life". In the questionnaire the respondents were offered to specify presence or absence of long-term problems with health, presence or absence of long-term or chronic diseases. Besides, the respondents answered the questions connected with the indication of their index of body weight, quality of sleep and rest, way of spending the leisure. The results of research carried out by CSO were grouped in five age groups for male and female respondents, and indicators for each voivodship of Poland were submitted.

In our research the data in a percentage ratio (proportions) of variants of respondents answers concerning self-assessed health, life satisfaction, problems with health, presence (absence) of chronic diseases etc. in each voivodship were calculated in view of age groups and sex. Besides the statistical characteristics of distributions of the data on self-assessed health, life satisfaction, presence (absence) of problems with health according to age groups and sex were given.

As independent (explanatory) variables dummy variable indicating age and gender group, and respondents belonging to particular voivodship were used. As dependent (explained) variable the proportion of the respondents in each voivodship, who chose the given variant of answer on the questionnaire developed by CSO were used. As proportion of the respondents is a limited value varied from 0 up to 100, therefore for econometric modelling tobit models with left and right censoring limit points were used. The parameters for tobit models were estimated by maximizing the log likelihood function (Maddala, 2005). Estimations of tobit models and their testing were carried out in Eviews.

3. The empirical analysis and econometric modelling

According to results of sociological research of the population of Poland in 2004 approximately 75,4 % of the population surveyed were on the whole pleased with their life, among them 14,8 % of the respondents evaluated life satisfaction at a level "very good" and 60,6 % at a level "good". The percentage of the respondents, who evaluated life satisfaction at a level "fair" made 21,7 %, and the percentage of the respondents, who evaluated life satisfaction at a level "poor and very poor" made 2,4 %. Approximately 75,7 % of the male respondents evaluated life satisfaction at a level "good and very good", among them 15,9 % evaluated their life as very good and 59,8 % as good. Among the female respondents the percentage of those who evaluated their life as "good and very good" made 75 %, among them 13,9 % of the women called their life very good and 61,1 % - just good. Approximately 21,7 % of the inquired men and 21,2 % of the inquired women noted life satisfaction at a level “fair”. About 2,1 % of the men and 2,6 % of the women evaluated their life as bad and very bad. In the group of the respondents at the age of 15-29 the highest percent of the respondents (approximately 27,7 %) estimated their life as "very good". In the group of people at the age of 20-29 this proportion made 21,9 % and further in the following age groups this indicator reduced: 18,1 % in the group of people at the age of 30-39; 12,5 % in the group of people at age of 40-49; 10,7 % in the group of people at age of 50-59; 7,4 % in the group of people at age 60-69 and 8,2 % in the group of people at age 70 and older. The percentage of the respondents, who estimated their life as good, was also lower in the senior age groups. So, in the group of the respondents at the age of 40-49 about 61,6 % of the respondents estimated their life as good, and in the group at the age 70 years and older only 54,8 % of the respondents. The educational attainment also influenced the level of life satisfaction. Thus among the respondents with higher education 25,8 % estimated their life as very good, while in the group of the respondents with education more than secondary this proportion made 18 %, and in the groups of the respondents with secondary and basic vocational training the given indicator made 16,4 % and 10,3 % respectively. In the groups of the respondents with basic and primary education only 7,4 % and 3,4 % of the respondents estimated their life as very good. The level of life satisfaction also differed in groups of the respondents with different marital status. So, 20,1 % of the single respondents estimated their life as very good and 58,4 % of the respondents of this group estimated their life as good. In the group of the family respondents 14,9 % estimated their life as very good and 64,4 % as good. In the group of the respondents of widows and widowers only 5,7 % estimated their life as very good and 49,4 % as good. Among the divorced respondents only 4 % estimated their life as very good and 41,9 % as good. The level of economic activity of the population also had influence on the respondents life satisfaction: 16,5 % of the economically active respondents estimated their life as very good, while in the group of economically inactive population this indicator made 13 %. About 40,9 % of the respondents with a very good state of health estimated their life as very good and 51,1 % as good. In the group of the respondents with a good state of health 15,7 % of the respondents estimated their life as very good and 70,2 % as good. In the group of the respondents with a poor and very poor state of health only 8,6 % of the respondents specified very good life.

Among the inquired respondents 17,9 %, declared about a very good state of health and 43,1 % of the respondents estimated their health as good. Among the male respondents the state of health as very good was estimated by 20,3 % and 44,2 % of the respondents estimated their health as good. Among female respondents the state of health as very good estimated by 16,0 % and 42,2 % of the respondents estimated their health as good.

There is no essential difference between the urban and village population as for their state of self-assessed health indicators. With age of self-assessed health indicators change for the worse, so in the age group of 15-19 37,1 % considered their state of health as very good, in the age group of 20-29 about 29,6 % estimated their health as very good. In the age group of 30-39 only 16,5 % of the respondents estimated their state of

health as very good, and in the age group of 40-49 this indicator made 7,1 %. In senior age groups the health as very good was estimated by less than 3 % of the respondents. A self-assessed health indicator of the respondents also depended on their educational background. Thus among the respondents with higher education 19,1 % admitted a very good state of health, while for the group of the respondents with secondary education this proportion made 13,9 %, and for the group of the respondents with basic education only 10,7 %. Among the single respondents 28,6 % admitted their state of health as very good and 49,7 % - as good. Among the family respondents only 8,7 % admitted a very good state of health and 41,5 % - a good state of health. Among the widows, widowers and divorced respondents the proportion of those who estimated the health as fair or poor and very poor prevailed. It is necessary to note, that the marital status to some extend depends on age groups, thus most of the single people are young, while most of the widows and widowers are elderly people. The economically active population, as follows from results of the inquiry has higher level of self-assessed health indicators, than economically inactive population. Thus, among the respondents from the group of economically active population 15,6 % admitted a very good state of health and 52,0 % - a good state of health. Among the economically inactive population 9,8 % of the respondents admitted a very good state of health and 28,5 % of the respondents - good state of health.

It is necessary to note, that the indicators of a self-assessed life satisfaction (SASL) and self-assessed health (SAH) a little bit changed over voivodships of Poland. The difference between means for SASL and SAH indicators in gender and age groups was very essential.

As medical and social research show (Karski, 1994.), the state of health and life satisfaction are influenced not only by social and demographic factors, but also by a number others: sickness rate and health problems, lifestyle, the way of spending the leisure time, balanced diet, ecological conditions etc.

In this research the explanatory variable were chosen such as: 1. demographic variable (sex, age groups of the respondents); 2. variable, describing an objective state of health: presence (absence) of long-term problems with health and presence (absence) of long-term or chronic diseases; 3. variable, describing lifestyle: quality of sleep, way of spending leisure time and food-related behaviour. The age groups were divided as follows: the age group of 15-29, the age group of 30-49, the age group of 50-69, the age group of 70 and older. The way of spending leisure time by the respondents was shown by means of nominal variable, such as: 1. walks, gymnastics, riding a bicycle; 2. running, swimming, physical exercises; 3. intensive trainings (for example, in training halls). The culture of feedings could indirectly be estimated by body mass index (BMI) of the respondents, who were divided into three categories: with unsufficient weight; weight within the normal range; surplus weight and fatness.

It is necessary to note, that on the basis of use of Student criterion for independent samples, there is no significant statistical difference at the age group of 15-29 between male and female respondents, who had long-term problems with health. But for other age groups there exists significant difference between average values describing presence (absence) of long-term problems with health for male and female respondents. So, in the age group of 30-49, age group of 50-69, age group 70 and older the average percent of women having long-term problems with health is a little bit higher, than that of men. The significant statistical difference between average values of indicators of presence (absence) of long-term or chronic diseases is observed in different age and gender groups.

The statistical analysis of samples shows that for groups of male and female respondents in the age group of 15-29 indicating bad quality of sleep, significant difference in average values is not observed. The same result was observed for male and female respondents in the age group of 30-49, indicating the fair quality of sleep.

We analysed the average values and standard deviations for respondents with different ranges of body mass index (BMI) in the samples with account of age and gender groups. The category of the respondents with unsufficient weight corresponds to values of BMI below 20; the category of the respondents with weight

within the normal range corresponds to values of BMI above 20 and below 27; the category of the respondents with surplus weight and obesity corresponds to values of BMI exceeding 27. For the majority of age and gender groups the significant statistical differences are observed. For example, for male respondents in the age group of 15-29 with unsufficient weight the average proportion makes 12,95 %, and for females 38,73 %. However, in the senior age groups (50 years old and more) the difference between average values of male and female respondents with unsufficient weight is low. No significant statistical difference is observed between average percents for the male and female respondents in the age group of 50-69 with normal body weight. In the age groups of 15-29 and 30-49 with surplus weight the average percent of the male respondents is much higher, than that of women. But in the senior age groups the difference between average percents of the male and female respondents with surplus weight is considerably lower.

The data on spending leisure time and average values of percents of the respondents engaged in these or those kinds of physical activity with account for age and gender groups by the respondents were analysed. For the majority of age and gender groups the significant differences are observed. So, in respondents age group of 15-29 average percent of men engaged in the first type of physical activity (walks, gymnastics, riding a bicycle) made 78,81 %, while this indicator for women made 83,72 %.

However, in this age group the average percent of men engaged in the second kind of physical activity (running, swimming, physical exercises) was much higher, than that of women. The same is true for the third kind of physical activity (intensive trainings), average percent of the inquired men engaged in intensive trainings in the age group of 15-29 made 22,15 %, while for women this indicator made 5,37%. However, in senior age groups the difference between indicator of physical activity in various gender groups becomes lower and then insignificant. So, we don't observe significant statistical difference between average percents of the men and women in the age group of 30-49 engaged in running, swimming and physical exercises. The same result is for samples of men and women in the age group of 50-69 engaged in the first and second types of physical activity. As to average time of various kinds of physical activity within a week, this indicator is a little bit higher for men, than for women.

For the more detailed research of influence of separate social and demographical factors on SASL and SAH indicators tobit models with left and right censoring limit points were used.

In these models the indicators (proportions of respondents) for relevant nominal variables such as SASL, SAH and other were used.

The first model (tab. A.1, Appendix A) represents the dependence of variable Y_LIFE1 (the percentage of the respondents who have estimated their life as very good and good) of such variable, as: D_A1, D_A2, D_A3, X_SEX, Z_HEALTH1, Z_HEALTH3 and set of dummy variables: X_W1- X_W15, reflecting the belonging of respondents to particular voivodship of Poland. Variable D_A1, D_A2, D_A3 are dummy variable for display of respondents belonging to the following age groups: 15-29, 30-49, 50-69. Variable X_SEX also is used for display of gender group of the respondents and accepted value 1 for the male respondents and 0 for the female respondents. Variable Z_HEALTH1 reflects percent of the respondents, who estimated their state of health as "good and very good" and Z_HEALTH3 reflects percent of the respondents, who have estimated state of health as "poor and very poor".

As can be seen from the results of estimation and testing of the given model (tab. A.1, Appendix A) the estimated parameters for such variables as: D_A1, D_A2, D_A3, X_SEX are statistically significant at level 1 % and they have correct signs reflected the sense of impact of each explanatory variables to dependent variable. For variable Z_HEALTH1 and Z_HEALTH3 correct estimated parameters were obtained, these estimations are statistically significant at level 5 %. It proves, that the age groups, gender factor and self-assessed health indicator render significant influence on good life satisfaction. But for dummy variables X_W1- X_W15, reflecting the belonging of respondents to particular voivodship of Poland, estimated

parameters were not statistically significant. However, application of Wald test with null hypothesis, that the estimated parameters for variable X_W1- X_W15 are equal 0, was rejected.

The second model represents dependence variable Y_LIFE2 (the percentage of the respondents who admitted their life as fair) of such above mentioned variables, as: D_A1, D_A2, D_A3, X_SEX, Z_HEALTH1, Z_HEALTH3 and a set dummy variable X_W1- X_W15. As in the previous case, the estimated parameters for variables D_A1, D_A2, D_A3, X_SEX are statistically significant at level 1 % and estimated parameters have correct signs. For variables Z_HEALTH1 and Z_HEALTH3 estimated parameters have correct signs and they are statistically significant at level 5%.

The similar results were received for the third model, reflecting the dependence of variable Y_LIFE3 (the percentage of the respondents who estimated their life as bad and very bad) of such above mentioned variables as: D_A1, D_A2, D_A3, X_SEX, Z_HEALTH1, Z_HEALTH3 and X_W1-X_W15. As before we received correct estimated parameters. For variable X_SEX the estimated parameter was statistically significant at level 1 %, for variables D_A1 and Z_HEALTH3 estimated parameters were statistically significant at level 5 %. For variables D_A2 and D_A3 estimated parameters were statistically significant at level 10 %.

In the following model we analysed the dependence of variable Z_HEALTH1 (the percentage of the respondents who estimated their state of health as good and very good) of such variables, as: D_A1, D_A2, D_A3, X_SEX, X_W1- X_W15 and variable Z_LTHC1, showing percent of the respondents having long-term problems with health. It is necessary to note, that for parameters for variables D_A1, D_A2, D_A3 and Z_LTHC1 we obtained correct signs and estimations were statistically significant at level 1 %. For variable X_SEX estimated parameter was statistically significant at level 10 %. In view of the received values of estimated parameters, it can be seen that with transition in the subsequent age group percent of self-assessed health indicator as “good and very good” is reduced. Also, the presence of long-term problems with health essentially reduces a parameter of a self-assessed health indicator as “good and very good”.

It is also necessary to note, that in the given model for the half dummy variables X_W1- X_W15, estimated parameters were statistically significant. Thus, statistically significant at level 10 % was estimated parameter for Lubuskie voivodship, statistically significant at level 5 % were estimated parameters for dummy variables related with such voivodships, as: Dolnoslaskie, Podlaskie, Opolskie and Swietokrzyskie. Statistically significant at level 1 % were estimated parameters for dummy variables related with such voivodships, as: Lubelskie, Lodzkie, Podkarpackie and Warminsko-mazurskie.

We received rather good modeling results of dependent variable Z_HEALTH2 (the percentage of the respondents who admitted state of their health as fair) and Z_HEALTH3 (the percentage of the respondents, who admitted the state of their health as poor and very poor) of such variables, as: D_A1, D_A2, D_A3, X_SEX, X_W1- X_W15 and variable Z_LTHC1. In given model for Z_HEALTH2 the estimated parameters for variables D_A1 and D_A2 were statistically significant at level 5 %, but estimated parameter for variable Z_LTHC1 was not statistically significant. The number of statistically significant the estimated parameters for dummy variables X_W1- X_W15 was lower. In next model for Z_HEALTH3 the estimated parameters for dummy variables D_A1, D_A2, D_A3 were statistically significant at level 5 % and estimated parameter for variable Z_LTHC1 was statistically significant at level 10 %.

The model of dependence of variable Z_LTHC1 (the percentage of respondents having long-term problems with health) from such variable, as: D_A1, D_A2, D_A3, X_SEX, a set of dummy variables X_W1- X_W15, and variable Z_LTIL1, reflecting percent of the respondents with long-term or chronic diseases, was built. In the given model we received correct estimated parameters for variables D_A1, D_A2, D_A3 and Z_LTIL1, these estimations were statistically significant at level 1 %.

From results of estimated parameters account it can be seen, that with age the risk of long-term problems with health considerably grows. The long-term or chronic illnesses result in the increase of proportions of the

persons with long-term problems with health. Variable X_SEX, reflecting gender group, is not so essential at modeling, because the estimated parameter for this factor is not statistically significant. It is also necessary also to indicate, that for some dummy variables, reflecting respondents belonging to particular voivodship the estimated parameters were statistically significant at level 5 %.

We examined another specification of model for dependent variable Z_LTHC1. As explanatory variables the following we used: D_A1, D_A2, D_A3, X_SEX, a set of dummy variables X_W1- X_W15 and new variables: IMB3 (proportion of the respondents with surplus weight and obesity); variables CSL2 and CSL3. Variable CSL2 reflects proportion of the respondents, who estimated quality of the sleep as "fair", and variable CSL3 characterizes proportion of the respondents, who estimated quality of the sleep as "bad and very bad". It is necessary to note, that for variables D_A1, D_A2, D_A3, X_SEX, CSL2 and CSL3 the estimated parameters are correct and statistically significant at level 5 %. By results of estimation it can be seen, that with age the risk of problems with health considerably grows. In addition, from results of the given model, it is possible to assume, that the growth of number of persons who has problems with sleeping (variable CSL2 and CSL3) results in increase of proportion of people with long-term problems with health. It is necessary to note, that for many voivodships the estimated parameters at dummy variables were statistically significant at level 5%. At the same time, the estimated parameter at variable IMB3 was not statistically significant. It is possible to suggest that another variable describing high degree of obesity, where BMI>30, is reasonable to include in this model.

Then we analysed the model of dependent variable Z_LTIL1 (the percentage of the respondents with long-term or chronic diseases) of such variables, as: D_A1, D_A2, D_A3, X_SEX, a set of dummy variables X_W1- X_W15, variables IMB3, CSL2, CSL3 and variable ATHB1, reflecting average time first kind of physical activity (walks, gymnastics, riding a bicycle) per week. It is necessary to note, that in the given model the estimated parameters for such variable, as: D_A1, D_A2, D_A3, X_SEX and CSL2 were correct and statistically significant at level 1 %. The estimated parameter at variable CSL3 was statistically significant at a level 5 %. It is necessary to note, that for some voivodships the estimated parameters at dummy variables were statistically significant at level 5%. At the same time, the estimated parameters at variables IMB3 and ATHB1 were not statistically significant.

We built another model of dependent variable Z_LTIL2 (the percentage of the respondents without long-term or chronic diseases) of such variables, as: D_A1, D_A2, D_A3, X_SEX, a set of dummy variables X_W1- X_W15, and variables IMB3, CSL2, CSL3. For variable D_A1, D_A2, D_A3, X_SEX, CSL2 the estimated parameters were correct and statistically significant at level 1 %. As in the previous case, for some voivodships the estimated parameters at dummy variables were statistically significant at level 5 % or 10 %.

We analysed the model of dependent variable IMB3 (proportion of the respondents with surplus weight and obesity) of such variables, as: D_A1, D_A2, D_A3, X_SEX, HB1 and HB2, ATHB, CSL2 and CSL3. Variable HB1 reflects percent of the respondents engaged in the first kind of physical activity (walks, gymnastics, riding a bicycle) and variable HB2 reflects percent of the respondents engaged in the second kind of physical activity (running, swimming, physical exercises). Variable ATHB characterizes average time in all three kinds of physical activities, i.e. walks, gymnastics, riding a bicycle, running, swimming, physical exercises and intensive trainings. In the given model the estimated parameters for such variable, as: D_A3, HB1 and CSL3 were statistically significant at level 1 %. The estimated parameters for variable D_A1 and HB2 were statistically significant at level 10 %. Thus, the significant risk of obesity is connected with the senior age group (50-69), gender factor and bad quality of sleep. At the same time, the occupation of various physical activities essentially reduce percent of the persons with surplus weight and obesity.

Another specification gives the modified model for dependent variable Y_LIFE1 (the percentage of the respondents who estimated their life as very good and good) of such variables, as: D_A1, D_A2, D_A3, X_SEX, IMB3, ATHB1, CSL2, CSL3 and a set of dummy variables X_W1- X_W15, reflecting respondents

belonging to particular voivodship of Poland. In the given model the estimated parameters for variables D_A1, D_A2, D_A3, X_SEX, CSL2 and CSL3 were statistically significant at level 1 %. It means that as previous model (see tab.A.1, Appendix A) age and gender factors essentially influence the levels of life satisfaction. Besides from modified model it can be seen that with deterioration of quality of sleep the life satisfaction is essentially reduced. At the same time, the estimated parameters at variable IMB3 and ATHB1 were not statistically significant. These factors do not has essential influence on variable Y_LIFE1, describing percent of the respondents pleased with their life.

As in previous cases we built the modified model for dependent variable Y_LIFE2 (the percentage of the respondents who estimated their life as fair) of such variables, as: D_A1, D_A2, D_A3, X_SEX, IMB3, ATHB1, CSL2, CSL3 and a set of dummy variables X_W1- X_W15. For the given model the estimated parameters at variables D_A1, D_A2, X_SEX, CSL2 and CSL3 were statistically significant at level 5 %. From results of estimated parameters at variables CSL2 and CSL3, it can be seen, that the increase of the persons with sleep problems results in the increase of percent of people estimating quality of the life as fair.

Finally, we show results for the modified model of dependent variable Y_LIFE3 (the percentage of the respondents who estimated their life as bad and very bad) of such variables, as: D_A1, D_A2, D_A3, X_SEX, IMB3, ATHB1, CSL2 and CSL3, a set of dummy variables X_W1- X_W15. For variables D_A1, D_A2, X_SEX, CSL2 and CSL3 the estimated parameters were statistically significant at level 5 %. As in the previous case, from results of estimated parameters at variable CSL2 and CSL3 it can be seen, that the increase of the persons with sleep problems results in the increase of percent of people estimating quality of their life as bad and very bad.

Thus, on the basis of econometric modeling the essential influence of demographic factors and lifestyle on indicators of a self-assessed health and life satisfaction is shown.

Conclusions

The analysis of influence of social and demographic factors on a self-assessed health and life satisfactory indicators are extremely important components of social monitoring. On the basis of the results such statistical and econometric research argued recommendations for social programs and information campaigns aimed at promotion of healthy lifestyle can be developed; the preliminary forecasts on efficiency of similar programs for improving the quality of health and life of the population can be made.

In Poland it is necessary annually to carry out such sociological surveys of households and to make initial databases accessible for dynamic panel research. In a number of cases, with consideration for complexity of scale sociological research realization all over the country it is advisable to introduce pilot medical and social projects allowing to collect information necessary for analysis and modelling, on the example of small cities or some hospitals.

This will make it possible to carry out more advanced econometric analysis, to take into account dynamic changes in respondents' self-assessed indicators and to reveal the influence of a number of other important factors, such as education, income, social and marital status, the quality of medical services and the realization of preventive measures or campaigns promoting a healthy lifestyle.

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Appendix A. Results of econometric modelling for dependent variable Y_LIFE1

Table A.1Censored regression model for dependent variable Y_LIFE1 (specification 1)

Variables	Coefficient	Std. Error	z-Statistic	Prob.
C	87.66283	19.84385	4.417632	0.0000
D_A1	-104.1459	30.33255	-3.433469	0.0006
D_A2	-56.92527	21.14867	-2.691671	0.0071
D_A3	-22.34623	7.925182	-2.819649	0.0048
X_SEX	-18.32142	3.049684	-6.007644	0.0000
X_W1	5.460089	7.658293	0.712964	0.4759
X_W2	5.026874	7.602323	0.661229	0.5085
X_W3	4.851369	8.166255	0.594075	0.5525
X_W4	12.41349	7.860486	1.579226	0.1143
X_W5	7.129115	8.092981	0.880901	0.3784
X_W6	3.707542	7.533486	0.492142	0.6226
X_W7	2.798212	7.598752	0.368246	0.7127
X_W8	4.571687	7.626980	0.599410	0.5489
X_W9	6.311389	7.665174	0.823385	0.4103
X_W10	0.484267	7.655485	0.063258	0.9496
X_W11	3.250806	7.649068	0.424994	0.6708
X_W12	5.735257	7.603158	0.754326	0.4507
X_W13	1.372109	7.536098	0.182071	0.8555
X_W14	6.232984	7.691320	0.810392	0.4177
X_W15	12.05543	7.801349	1.545300	0.1223
Z_HEALTH1	0.934931	0.460711	2.029320	0.0424
Z_HEALTH3	-0.762632	0.350852	-2.173655	0.0297
Error Distribution				
SCALE:C(23)	14.12563	1.042139	13.55446	0.0000
R-squared	0.437872	Mean dependent var		66.78182
Adjusted R-squared	0.320093	S.D. dependent var		17.23877
S.E. of regression	14.21448	Akaike info criterion		8.288388
Sum squared resid	21215.41	Schwarz criterion		8.800863
Log likelihood	-507.4569	Hannan-Quinn criter.		8.496609